



***U.S. DEPARTMENT OF COMMERCE***  
***Office of Inspector General***

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***NATIONAL OCEANIC AND  
ATMOSPHERIC ADMINISTRATION***

***Work on Electronic Charting Database  
Should Be Re-competed***

*Audit Report No. STD-13440/March 2001*

**PUBLIC  
RELEASE**

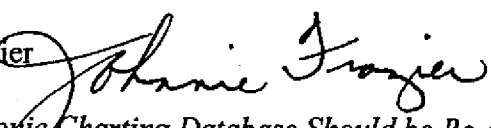
*Office of Audits, Science and Technology Audits Division*



UNITED STATES DEPARTMENT OF COMMERCE  
The Inspector General  
Washington, D.C. 20230

MAR 29 2001

**MEMORANDUM FOR:** Scott B. Gudes  
Acting Under Secretary for Oceans and Atmosphere

**FROM:** Johnnie E. Frazier 

**SUBJECT:** *Work on Electronic Charting Database Should be Re-competed*  
Final Audit Report No. STD-13440-1-0001

Attached is our final report on the performance audit of NOAA's cooperative research and development agreement (CRADA) with Maptech, Inc. The audit found that NOAA should re-compete the work on its electronic nautical charting database and determine if a CRADA is still the most appropriate legal instrument for continuing this work. Also, the audit found that NOAA should strengthen the internal controls related to its CRADA policy, CRADA review panel membership, verification of collaborator research payments, and enforcement of the project's reporting requirement. The executive summary begins on page i, and recommendations appear on pages 7, 11, and 13. NOAA's response to our draft report is summarized in the report and its complete response is included as Appendix 1.

Please provide us with your audit action plan addressing the recommendations within 60 calendar days, in accordance with Department Administrative Order 213-5. The plan should be in the format specified in Exhibit 7 of the DAO. Should you have any questions regarding the preparation of the audit action plan, please contact Ronald Lieberman, Director, Science and Technology Audits Division, at (301) 713-2070.

We appreciate the cooperation and courtesies extended to us by your staff during our review.

Attachment

cc: Sonya Stewart  
Chief Financial Officer/Chief Administrative Officer

Barbara Martin  
Chief, Audit, Internal Control and Information Management Office

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## EXECUTIVE SUMMARY

The Federal Technology Transfer Act of 1986, as amended (15 U.S.C. §3710a), authorizes the government to enter into a cooperative research and development agreement (referred to hereafter as the CRADA) with a non-federal partner to conduct specified research or development that is consistent with the missions of the government. Both parties exchange personnel, services, facilities, equipment, intellectual property, or other resources, but only the non-federal partner may provide funds.

CRADAs are intended to promote technology transfers and the commercialization of federally developed technology by providing the private sector with access to the research and development being done by federal laboratories. A CRADA is not a federal procurement contract, grant, or cooperative agreement. In addition, because a CRADA is not a federal procurement contract, the provisions of the Competition in Contracting Act do not apply, specifically the publication or competition requirements.

In October 1994, NOAA's National Ocean Service, through its Office of Coast Survey, entered into a CRADA with BSB Electronic Charts, a company that was subsequently acquired by Maptech, Inc. (referred to hereafter as the collaborator). The objective of the CRADA is to perform research and development on electronic nautical charts and on electronic nautical chart data, systems, software, and other related matters. The CRADA grants the collaborator exclusive access to NOS's official data files which are used to produce the electronic nautical charts, and the exclusive right to sell NOAA's official electronic nautical charts.

The current CRADA is scheduled to expire on April 6, 2001, but will automatically renew for four years unless either party provides notice to the other, no later than February 5, 2001, that it does not choose to renew the CRADA. A NOAA review panel was convened in September 2000 to consider technical and user aspects of the CRADA, as well as alternatives to the CRADA, and to determine whether it should recommend to NOAA management the CRADA's renewal, re-competition, or termination. At the time we completed our fieldwork, the panel had not set a date to brief NOAA management.

In April 2000, a coalition of private sector nautical charting firms contacted the OIG to allege that NOAA was improperly using its CRADA authority under the Federal Technology Transfer Act of 1986, as amended, to create an anti-competitive, sole-source monopoly with the collaborator. Specifically, the coalition asserted that the products to be created under the CRADA, electronic nautical charts, already exist in the private sector and that there is no need for NOAA to expend tax dollars to duplicate this capability. Also, the coalition argued that current NOAA policy limiting access to hydrographic data to the collaborator must be changed to encourage and stimulate competition that should lead to better products at lower prices.

Because of exigencies created by the February 5 deadline, we primarily limited our audit to determining whether NOAA should automatically renew the CRADA. Our findings and recommendations are summarized as follows:

**NOAA should re-compete the work on its electronic nautical charting database.** To assure delivery of the best value product to chart purchasers, NOAA should re-compete the work on its electronic nautical charting database before the CRADA automatically renews for an additional four years. Also, NOAA should determine whether a CRADA is still the most appropriate legal instrument for continuing such work. It has been almost seven years since NOAA first solicited competition for this work, and the chart-making industry has matured significantly during this period. Although the Technology Transfer Act does not require the Government to compete the work conducted through a CRADA, NOAA should strengthen its CRADA policy by including periodic reassessments of whether the work should be re-competed. Only through re-competition can NOAA ensure that it is providing electronic nautical charts with the highest quality, in a timely manner, and at the lowest cost to chart purchasers (see page 4).

**NOAA should strengthen internal controls over collaborator research payments.** If NOAA determines that a CRADA is still the most appropriate legal instrument for continuing the work on its electronic nautical charting database, it should strengthen its internal controls over collaborator research payments by regularly verifying the underlying basis for those payments. Although the CRADA includes a provision for allowing it to do so, NOAA has not reviewed the collaborator's accounting records to verify reported product-net revenues, which the collaborator uses to calculate its research payments to NOAA. As a result, NOAA cannot provide reasonable assurance that the collaborator is paying the full amount of the research payment to which NOAA is entitled. A NOAA official told us that there is no need to verify such records because the sums involved are not large enough to warrant such an assessment and there is no indication of inaccuracies. However, internal control standards promulgated for the federal government call for the safeguarding of its assets through effective control activities, which include verifications (see page 10).

**NOAA should retain and enforce the CRADA's reporting requirement.** If NOAA determines that a CRADA is still the most appropriate legal instrument for continuing the work on its electronic nautical charting database, it should ensure that both parties to the CRADA fully comply with the agreement's reporting requirement. Our limited review found that neither NOAA nor Maptech have exchanged formal written progress reports, as required by the CRADA. NOAA believes the requirement is unnecessary and is planning to remove it from the CRADA. However, without these reports, NOAA is also not in compliance with the U. S. General Accounting Office's internal control standards for the federal government. Full compliance with the CRADA reporting requirement is needed to ensure the effective and efficient management of project work (see page 12).

At the conclusion of our review, we discussed our findings and recommendations with NOAA officials, who did not disagree with our findings and recommendations. On pages 7, 11, and 13, we offer seven recommendations to the Acting Under Secretary for Oceans and Atmosphere to address the concerns raised in this report.

In response to the draft report, NOAA stated that it agreed with all of the recommendations except for one. NOAA disagrees with the recommendation to fully and openly compete its electronic nautical charting work as soon as possible if a CRADA is found to be the appropriate instrument. NOAA informed us that it determined that a CRADA remains the best legal instrument for continuing the development of its electronic nautical charting work. However, it decided not to fully and openly compete for its raster products as recommended. Instead, it recently renewed the CRADA for raster products until June 13, 2005. By contrast, NOAA has taken or plans to take certain actions that will promote competition for vector products. While we are pleased that NOAA will promote competition for vector products, we are disappointed that NOAA will not compete for its raster products. We reaffirm our belief that such competition for its raster products would have been in the bureau's best interests because it would have ensured delivery of the best value product to its customers.

## INTRODUCTION

This report presents the results of our performance audit of the cooperative research and development agreement (CRADA) between NOAA's National Ocean Service (NOS) and Maptech, Inc. The Federal Technology Transfer Act of 1986, as amended (15 U.S.C. §3710a), authorizes governmental agencies to enter into a CRADA with a non-federal partner to conduct specified research or development that is consistent with the missions of the agencies. Both parties exchange personnel, services, facilities, equipment, intellectual property, or other resources, but only the non-federal partner may provide funds.

CRADAs are intended to promote technology transfers and the commercialization of federally developed technology by providing the private sector with access to the research and development being done by federal laboratories. A CRADA is not a federal procurement contract, grant, or cooperative agreement. In addition, because a CRADA is not a federal procurement contract, the provisions of the Competition in Contracting Act do not apply, specifically the publication or competition requirements.

Performance audits look at the efficiency, effectiveness, and economy of the Department's programs, activities, and information technology systems. They may check a unit's compliance with laws and regulations, and evaluate its success in achieving program objectives. This performance audit was conducted in accordance with *Government Auditing Standards* issued by the Comptroller General of the United States, and was performed under the authority of the Inspector General Act of 1978, as amended, and Department Organization Order 10-13, dated May 22, 1980, as amended.

## BACKGROUND

One of NOAA's strategic goals is to meet mariners' and pilots' emerging technological needs by providing them with the tools for safe navigation. Nautical charts represent the most fundamental tool for safe and efficient marine navigation. They also contribute significantly to the safety of life and property while supporting economic growth and protecting the coastal environment.

NOS's Office of Coast Survey (OCS) produces and maintains NOAA's official nautical charts. OCS's inventory includes approximately 1,000 paper nautical charts that cover the coastal areas of the United States and the Great Lakes. These nautical charts are used by commercial shipping, the fishing industry, U.S. Naval and Coast Guard operations, state and local governments, and recreational boaters throughout the United States. Federal law requires all ships in excess of 1,600 gross tons to have and use current editions of NOAA's official nautical charts.

In addition to producing its paper nautical charts, OCS is responsible for building, maintaining, and delivering a digital nautical charting database to underpin new electronic navigation systems that integrate satellite positioning, tidal heights and currents, radars and sonars, and navigational aids. To this end, NOS, through OCS, entered into a CRADA in October 1994 with BSB Electronic Charts, a company that was subsequently acquired by Maptech, Inc. (referred to hereafter as the collaborator). The objective of the CRADA is to perform research and development on electronic nautical charts and on electronic nautical chart data, systems, software, and other related matters. The CRADA grants the collaborator exclusive access to NOS's official data files, which are used to produce the electronic nautical charts, and the exclusive right to sell NOAA's official electronic nautical charts.

Electronic nautical charts are produced in two formats, raster and vector. The first area of research and development under the CRADA focused on making nautical charts available as digital raster nautical charts. A raster nautical chart is a georeferenced, digital picture of a paper nautical chart, produced by scanning at high resolution the original color separates, which are used to print the paper nautical charts. It exactly reproduces the paper nautical chart. The current CRADA was later amended to include vector nautical charts as an agreed-upon product. A vector nautical chart does not display an existing nautical chart. Instead, it is constructed from a computer database of nautical chart features and attributes, such as shoreline contours, soundings, underwater obstructions, and navigational aids. The result is a nautical chart-like display.

The current CRADA is scheduled to expire on April 6, 2001, but will automatically renew for four years unless either party provides notice to the other, no later than February 5, 2001, that it does not choose to renew the CRADA. A NOAA review panel was convened in September 2000 to consider technical and user aspects of the CRADA, as well as alternatives to the CRADA, and to determine whether it should recommend to NOAA management the CRADA's renewal, re-competition, or termination. At the time we completed our fieldwork, a date for the panel to brief NOAA management had not been set.

In April 2000, a coalition of private sector nautical charting firms contacted the OIG to allege that NOAA was improperly using its CRADA authority under the Technology Transfer Act, as amended, to create an anti-competitive, sole-source monopoly with the collaborator. Specifically, the coalition asserted that the products to be created under the CRADA, electronic nautical charts, already exist in the private sector and that there is no need for NOAA to expend tax dollars to duplicate this capability. Also, the coalition argued that current NOAA policy limiting access to hydrographic data to the collaborator must be changed to encourage and stimulate competition that should lead to better products at lower prices.

## OBJECTIVES, SCOPE, AND METHODOLOGY

Because of the need for NOAA to thoroughly consider its options before deciding whether to renew the expiring CRADA, we primarily limited our audit to determining whether NOAA should automatically renew the CRADA.

The scope of our audit included a review of the original CRADA and all amendments. As of November 2000, a total of nine amendments had been issued.

Our review methodology included interviewing NOAA personnel in OCS and NOAA's Office of General Counsel. We also interviewed officials from the U.S. Army Corps of Engineers and the Federal Aviation Administration and representatives of private-sector companies that sell electronic nautical charts. We observed the OCS nautical chart-making process and the three nautical chart formats - paper, raster, and vector. We reviewed relevant federal laws, regulations, and guidelines, including the Federal Technology Transfer Act; the Freedom of Information Act; the U.S. Coast Guard Navigation Safety Regulations; the Federal Acquisition Regulation; the General Accounting Office's *Standards for Internal Control in the Federal Government*; and NOAA's CRADA policy, included in NOAA Administrative Order 201-103. Among the documents we examined were the CRADA and its amendments and the coalition's allegations. At the conclusion of our review, we discussed our findings and recommendations with NOAA officials, who did not take exception to the facts as presented. Our audit was conducted at NOAA's headquarters in Silver Spring, Maryland. Our fieldwork was conducted from August to December 2000.

We assessed the CRADA's compliance with the requirements of the Federal Technology Transfer Act of 1986, as amended, and evaluated the adequacy of NOAA's internal controls over the CRADA. We concluded that it was not inappropriate for NOAA to consider using a CRADA when the project began in 1994. Regarding internal controls, we found that NOAA needs to strengthen its CRADA policy, CRADA review panel membership, verification of collaborator research payments, and enforcement of the project's reporting requirement. The results of our audit are discussed in the body of the report. We did not assess the reliability of computer-generated data because such data was not relevant to our review.

## FINDINGS AND RECOMMENDATIONS

### I. NOAA Should Re-compete the Work on Its Electronic Nautical Charting Database

To ensure delivery of the best value product to its customers, NOAA should re-compete the work on its electronic nautical charting database before the CRADA automatically renews for an additional four years. Also, NOAA should determine whether a CRADA is still the most appropriate legal instrument for continuing such work. It has been almost seven years since NOAA first solicited competition for its work, and the chart-making industry has matured significantly during this period. Although the Technology Transfer Act does not require the Government to compete the work conducted through a CRADA, NOAA should strengthen its CRADA policy by including periodic reassessments of whether the work should be re-competed. Only through re-competition can NOAA ensure that it is providing electronic nautical charts with the highest quality, in a timely manner, and at the lowest cost to chart purchasers.

#### A. No competition in almost seven years despite a maturing industry

NOAA has not hosted an open competition for the work on its electronic nautical charting database in almost seven years. In 1992 and 1993, NOAA surveyed the nautical chart-making industry to gauge its capability to conduct the work. Then, in October 1993, NOAA solicited non-federal partners for the work, to be accomplished through a CRADA, in a *Commerce Business Daily* announcement. Thirty-seven companies expressed an interest. NOAA selected the collaborator in May 1994. It later amended the CRADA in March 1997, to renew it for an additional four years and in October 1998, to include vector nautical charts as an agreed-upon product. The latter amendment expanded the scope of the original announcement, which specified only raster nautical charts. Despite this change, NOAA did not solicit competition for its work before approving either of these amendments or at any other time since the initial CBD announcement.

During the period of almost seven years since NOAA competed the work on its electronic nautical charting database, the nautical charting industry has matured to the point where numerous companies now have, and may even surpass, the capability of NOAA's CRADA partner. To determine whether the technology to produce electronic nautical charts exists within the private sector, we surveyed seven (7) companies. We included in our survey a cross-section of both large and small companies. The results of our survey are included in Table 1.

**Table 1**  
**Results of OIG Survey of**  
**Seven (7) Private Nautical Chart-makers**

Description	Number of Companies
Produce and sell vector nautical charts <sup>1</sup>	6
Produce and sell only raster nautical charts <sup>2</sup>	1
Electronic nautical charts include full coverage of all U.S. waters	5
Electronic nautical charts include enhanced features <sup>3</sup>	6
Conduct ongoing research and development on electronic nautical charts	6
Have established nationwide or worldwide systems to market, sell, and distribute electronic nautical charts and to provide customer service	6
Believe they are capable of producing and selling NOAA's official electronic nautical charts	7

<sup>1</sup> Also produce raster electronic nautical charts for their own internal use in the manufacture of vector nautical charts  
<sup>2</sup> However, the company is conducting limited vector research.  
<sup>3</sup> These features vary among companies. Examples include weather and radar overlay, three-dimensional display, update service, color purity, data compression, tide and current data, and customized data for specific users.

Of the six companies that produce and sell vector nautical charts, officials from four companies told us that they have been doing so since the 1980s. Regarding the vector nautical charts being developed through the CRADA, a NOAA official told us that the nautical charts are not being sold at this time because their coverage is not yet sufficient. Only 89 of NOAA's 1,000 paper nautical charts have been converted to vector format. The official was not able to tell us when the nautical charts would be released.

Six of the seven companies surveyed told us that they are actively engaged in research and development related to the creation of electronic nautical charts. Examples of their research and development include refining, customizing, and optimizing nautical chart production processes; upgrading data transmission to users via on-line service; and improving product quality.

All of the companies surveyed believe that they have the capability to produce and sell NOAA's official nautical charts. The companies also said they could produce and sell the charts more economically than NOAA, are willing to publish all of NOAA's official charts at zero cost to the taxpayer, and already use the technology needed to produce and sell NOAA's official charts.

**B. NOAA should strengthen its CRADA policy  
to include periodic reassessments**

The Federal Technology Transfer Act of 1986, as amended, does not require or encourage Federal agencies to compete the work to be accomplished under a CRADA. However, NOAA Administrative Order 201-103, which sets forth NOAA policy for implementing the act, encourages competition. The policy invites NOAA laboratories to announce the availability of opportunities for cooperative research and development in appropriate medium, such as the *Commerce Business Daily* and professional journals. However, we believe that the policy does not go far enough to ensure the best value product to NOAA's customers. The policy should include periodic reassessment of whether the work should be re-competed or whether a CRADA is still the most appropriate legal instrument for continuing the work.

**C. Re-competition is likely to result in better  
nautical charts and allay private-sector concerns**

Without re-competition, NOAA cannot ensure that it is providing customers with the highest quality product, in the most timely manner possible, and at the lowest cost. Re-competing the work will provide NOAA with greater awareness of new companies in the industry, product enhancements, technical capabilities, and accomplishments. A NOAA official told us that the agency keeps abreast of the nautical chart-making industry by attending trade shows, conferences, and workshops; networking with companies; and reviewing technical publications. Although these methods are valuable, they may not provide NOAA with the most complete and accurate assessment of the industry's capabilities that results from the incentives offered by open competition. It is this assessment that will ultimately enable NOAA to provide its customers with the best nautical chart, at the lowest cost.

Re-competition will also enable NOAA to alleviate the concerns of, or reduce the possibility of costly litigation from, the nautical chart-making industry over NOAA's choice of its non-federal partner. As noted earlier in this report, a coalition of private-sector nautical charting firms contacted our office in April 2000 to allege that NOAA is improperly using a CRADA under the Technology Transfer Act to create an anti-competitive, sole-source monopoly with the collaborator. Besides the aforementioned benefits, full and open competition provides NOAA with an opportunity to demonstrate to members of the industry that it is sensitive to their concerns and the importance of maintaining the public trust.

**D. NOAA review panel to recommend action  
for expiring CRADA**

As noted earlier, a NOAA review panel met in September 2000 to consider technical and user aspects of the CRADA, as well as alternatives to the CRADA, and to recommend to NOAA management its renewal, re-competition, or termination. The panel has completed a report on its findings and recommendations but has not released it, pending the panel's briefing of NOAA management. The panel members include officials from NOAA's Marine Chart Division; the U.S. Coast Guard, representing Coast Guard Navigation Center/the mariner; NOAA Coastal Services Center, representing coastal managers and non-navigation users; and the U.S. Geological Survey, a sister agency that uses CRADAs. However, the panel does not include any procurement officials. Such officials would have provided the panel with expertise on the various alternative procurement instruments available.

**E. Recommendations**

We recommend that the Acting Under Secretary for Oceans and Atmosphere ensure delivery of the best value products and services to NOAA's customers by:

1. Not automatically renewing the existing CRADA.
2. Carefully assessing whether a procurement contract or a CRADA is now the most appropriate legal instrument for continuing its electronic nautical charting work.
3. Fully and openly competing NOAA's electronic nautical charting work as soon as possible if a CRADA is found to be the appropriate instrument.
4. Strengthening NOAA's CRADA policy to include periodic reassessments to determine if the work needs to be competed and if a CRADA is still the most appropriate legal instrument for the work.
5. Ensuring that at least one procurement official is included on any future NOAA CRADA review panel.

**F. NOAA Response**

NOAA agreed with all of the recommendations except for number three (3). NOAA stated that it determined that a CRADA remains the best legal instrument for continuing the development of its electronic nautical charting work. However, it decided not to fully and openly compete such work as recommended. Instead, it recently renewed the CRADA for raster products until June 13, 2005. The bureau asserts that competing the CRADA would disrupt the accessibility of

raster products to the public. NOAA also cited the continuing need for the collaborator's research and development on raster products and the limited number of firms engaged in the business of producing raster charts as other reasons for its non-competitive renewal of the CRADA.

In contrast, NOAA has taken or plans to take certain actions that will promote competition for vector products. NOAA told us that it has amended the existing CRADA to remove vector charts as an agreed-upon product and intends to issue a Federal Register notice soon announcing the availability of vector data to the public. Also, NOAA intends to work with the industry to develop standards and a certification process for the private production and distribution of vector charts.

#### **G.     OIG Comments**

With one exception, NOAA's reply is responsive to our recommendations. Regarding recommendation number 3, we are pleased that NOAA has taken or plans to take action to promote competition for vector products. However, we are disappointed that NOAA decided not to fully and openly compete for its raster products. We reaffirm our belief that such competition for its raster products would have been in the bureau's best interests because it would have ensured delivery of the best value product to its customer. As we reported earlier, NOAA has not competed for its nautical charting work in almost seven years despite a maturing industry. Therefore, NOAA cannot ensure that it is providing customers with the highest quality raster products, in the most timely manner possible, and at the lowest cost.

We do not agree with NOAA's rationale for not fully and openly competing for its raster products. Regarding NOAA's statement that competition would disrupt the availability of raster products to the public, NOAA did not provide evidence to support its claim, such as the results of a recent industry survey. With respect to NOAA's contention that competition would interfere with its need for continuing research and development on raster products, our survey showed that the industry conducts ongoing research and development on electronic nautical charts, especially in the aspects of service delivery and product enhancements. We are not aware of any reason why the industry would not continue in this regard during competition. Concerning NOAA's statement that there is a limited number of firms engaged in the business of producing raster charts, NOAA did not provide evidence to support its claim, such as official industry statistics or proof that chart-makers specializing in vector products would not want to compete for a broader and potentially lucrative customer base. We believe that NOAA may have underestimated the capability of the industry to facilitate a smooth transition between chart makers, which comes from the powerful incentives associated with full and open competition.

Regarding recommendation number 4, NOAA said that NOS will ensure the CRADAs for which it is responsible are periodically reviewed, but did not specifically indicate that NOAA's CRADA policy would be strengthened. The intent of our recommendation was that NOAA amend its written CRADA policy to include periodic reassessments. NOAA should indicate in its audit action plan when it plans to do so.

## **II. NOAA Should Strengthen Internal Controls over Collaborator Research Payments**

If NOAA determines that a CRADA is still the most appropriate legal instrument for continuing the work on its electronic nautical charting database, it should strengthen its internal controls over collaborator research payments by regularly verifying the underlying basis for those payments. Although the current CRADA includes a provision allowing it to do so, NOAA has not reviewed the collaborator's accounting records to verify reported product net revenues, which the collaborator uses to calculate its research payments to NOAA. As a result, NOAA cannot provide reasonable assurance that the collaborator is paying it the full amount of the research payment to which NOAA is entitled. A NOAA official told us that there is no need to verify such records. However, internal control standards promulgated for the federal government call for the safeguarding of its assets through effective control activities, which include verifications.

### **A. NOAA has not verified the collaborator's product net revenues**

The current CRADA requires the collaborator to pay NOAA five percent of the net revenues derived from sales of CRADA products. NOAA must use the payments for continuing research and development and matters related to the CRADA. Payment is to be accompanied by a quarterly report setting forth the amount of net revenue received and appropriate details for calculating the payment. The current CRADA also requires the collaborator to keep accurate and complete records of all transactions pertaining to the agreement for at least five years following a given reporting period. Upon reasonable notice, the records shall be available for review or copying by NOAA. In our opinion, the intent of the records retention and review provisions is to allow NOAA to regularly verify the accuracy and completeness of the reported net revenues by examining the collaborator's accounting records.

Despite these provisions, NOAA has not reviewed Maptech's accounting records to verify the accuracy and completeness of reported product net revenues. A NOAA official told us that, instead, the agency reviews the collaborator's report to see that all products have been included in the calculation, and that the reported quarter's performance is consistent with the previous quarter. Reportedly, when there is a question, NOAA calls Maptech and resolves the issue. No written report or analysis is produced, and only the most recent quarterly report of sales and revenues is retained. Also, the official stated that NOAA does not plan a separate, independent audit of Maptech's books.

The General Accounting Office (GAO) has prescribed internal control standards for the federal government. These standards, included in GAO's *Standards for Internal Control in the Federal Government*,<sup>1</sup> call for the safeguarding of government assets through effective

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<sup>1</sup> Reissued in November 1999.

control activities, which include verifications. Such controls help government program managers ensure accountability and achieve agency missions and program results through effective stewardship of public resources.

The NOAA official said that the agency does not verify Maptech's reported net revenues because the sums involved are not large enough to warrant such an assessment and there is no indication of inaccuracies. We disagree. Unless NOAA regularly examines the collaborator's accounting records, it does not have reasonable assurance that the collaborator is not under-reporting the gross revenue or over-reporting the credits for inventory returns for all products.<sup>2</sup>

#### **B. Recommendation**

We recommend that the Acting Under Secretary for Oceans and Atmosphere strengthen internal controls over collaborator research payments from the current CRADA, if NOAA determines that it is the most appropriate legal instrument for continuing the work on its electronic nautical charting database, by regularly verifying, through review of accounting records, the accuracy and completeness of related net revenues that are reported to NOAA.

#### **C. NOAA Response**

NOAA concurs with the recommendation. It advised us, however, that under the terms of the revised CRADA, NOS will no longer receive research payment fees.

#### **D. OIG Comments**

NOAA's reply is responsive to our recommendation.

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<sup>2</sup> Inventory returns relate to obsolete products and are subtracted from gross revenue to provide reported net revenue.

### **III. NOAA Should Retain and Enforce the CRADA's Reporting Requirement**

If NOAA determines that a CRADA is still the most appropriate legal instrument for continuing the work on its electronic nautical charting database, it should ensure that both parties fully comply with the agreement's reporting requirement. Our limited review found that NOAA and Maptech have not routinely exchanged formal written progress reports, as required by the current CRADA. NOAA believes the requirement is unnecessary and is planning to remove it. However, without these reports, NOAA is also not in compliance with GAO's internal control standards for the federal government. Full compliance with the current CRADA's reporting requirement is needed to ensure effective and efficient management of project work.

#### **A. Neither NOAA nor Maptech has fully complied with the CRADA reporting requirement**

Article 3.2 of the current CRADA requires both NOAA and Maptech to exchange formal written interim progress reports at least every six months after the CRADA becomes effective. Such reports are to set forth the technical progress made, discuss any problems that may have been encountered, identify any intellectual property developed, and establish goals and objectives requiring further effort. The article also requires the partners to exchange final reports of their results within four months after completing the project or after termination of the current CRADA.

We found, however, that since the CRADA became effective in November 1994, neither partner has fully complied with the reporting requirement. NOAA has not produced any such reports, and Maptech did not provide NOAA with its reports for two periods - July through December 1997 and January through June 2000.

A NOAA official told us that Article 3.2 was included as a means to help ensure that some level of communications was maintained. However, according to the official, experience has shown that the collaboration has been very close and that communications are not an issue. The official also said that NOAA plans to make an administrative change to the CRADA and remove this "unnecessary" requirement.

The significance that NOAA places on the database work that is the subject of these reports is evident from its Strategic Plan for 1995-2005, which includes promoting safe navigation as one of its goals. It also specifies that part of its strategy for implementing this goal is to build, maintain, and deliver a digital nautical charting database to underpin new electronic navigation systems that integrate satellite positioning, tidal heights and currents, radars and sonars, and navigational aids.

We agree that building, maintaining, and delivering this database is significant and that interim reporting plays an important role in tracking Maptech's progress. Nevertheless, without documenting the progress of these events, NOAA is not in compliance with the internal control standards embodied in GAO's *Standards for Internal Control in the Federal Government*. These standards require that written evidence be maintained for all significant events. Such evidence, in the form of adequately documented interim and final progress reports, is important for managers in controlling their operations. Progress reports provide, among other things, continuity during staff turnover, facilitate efficient review for project renewal decisions, could help in resolving disagreements with the collaborator, and protect the government from claims by private nautical chart makers and others that NOAA has not created new technology or that it has not exercised effective oversight over project work. We believe that full compliance with the reporting requirement is needed to ensure effective and efficient management of project work.

**B. Recommendation**

We recommend that the Acting Under Secretary for Oceans and Atmosphere strengthen internal controls over project work, if NOAA determines that a CRADA is still the most appropriate legal instrument for continuing the work on its electronic nautical charting database, by retaining and enforcing the current CRADA provision that requires the partners to exchange formal written interim progress reports at least every six months and final reports within four months of project completion.

**C. NOAA Response**

NOAA concurs with the recommendation.

**D. OIG Comments**

NOAA's reply is responsive to our recommendation.



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
CHIEF FINANCIAL OFFICER/CHIEF ADMINISTRATIVE OFFICER

MAR 7 2001

MEMORANDUM FOR: Larry B. Gross  
Acting Deputy Assistant Inspector General for Auditing

FROM: Sonya G. Stewart *Sonya Stewart*

SUBJECT: NOAA Response to Draft OIG Audit Report  
"Work on Electronic Charting Database Should be Re-competed,"  
Report No. STD-13440

Thank you for the opportunity to review and comment on the subject draft report concerning the National Oceanic and Atmospheric Administration's (NOAA) cooperative research and development agreement (CRADA) with Maptech, Inc. NOAA agrees with all of the presented recommendations except for one. NOAA disagrees with the recommendation to fully and openly compete NOAA's electronic nautical charting work as soon as possible if a CRADA is found to be the appropriate instrument. We believe that continuing a CRADA for raster products will allow for issuance of NOAA-Maptech Raster Nautical Charts without interruption while refinements in service delivery proceed to completion. Our full rationale is contained in the attached response.

If you have any questions concerning our response, or should you require further assistance, please contact me on (202) 482-2378 or Barbara Martin, Director, Audit, Internal Control, and Information Management on (301) 713-1150.

Attachment



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**NOAA Response to Draft Audit OIG Report "Work on Electronic Charting Database  
Should Be Re-competed," Report No. STD-13440**

**OIG Finding I - NOAA Should Re-compete the Work on Its Electronic Nautical Charting Database**

**OIG Recommendation 1:** We recommend that the Acting Under Secretary for Oceans and Atmosphere ensure delivery of the best value products and services to NOAA's customers by: Not automatically renewing the existing CRADA.

**NOAA Response:** NOAA concurs with this recommendation. The National Ocean Service (NOS) and the collaborator, Maptech, Inc., recently renewed and revised the CRADA to, among other things, remove the automatic renewal provision. The CRADA is now scheduled to expire on June 13, 2005. This will allow the partners to complete the remaining development necessary in the area of service delivery of raster charts as discussed below. NOS does not intend to renew the CRADA at the end of this term.

**OIG Recommendation 2:** We recommend that the Acting Under Secretary for Oceans and Atmosphere ensure delivery of the best value products and services to NOAA's customers by: Carefully assessing whether a procurement contract or a CRADA is now the most appropriate legal instrument for continuing its electronic nautical charting work.

**NOAA Response:** NOAA concurs with this recommendation. It has been determined that a procurement contract is not the most appropriate legal instrument for continuing NOS's electronic nautical charting work. With respect to raster nautical charting products, it has been determined that a CRADA remains the best legal instrument for continuing the development of these products. With respect to vector nautical charting products, it has been determined that open access to vector data may be the best mechanism for fostering the production of these products.

A wide range of options was explored to encourage both research and development efforts and the production of high quality electronic chart products that satisfy carriage requirements and meet mission needs. Options that were considered included in-house efforts, joint efforts with the industry, procurement, or open access to chart data. A variety of factors are relevant in deciding which option is appropriate for a given product including whether NOS is required by statute to produce a particular nautical product, how important the product is to NOS mission goals, whether the product currently is being produced and, if so, the degree of satisfaction with that method of production, whether research and development is required, whether the agency has the expertise to conduct the research and development and/or the commercialization of such a product, whether private industry can produce a product that meets agency standards and goals, whether the private sector is competitive, whether the product could best be researched, developed, and/or produced by a collaborative effort between government and industry, and the level of funding required under various options.

**NOAA Response to Draft Audit OIG Report "Work on Electronic Charting Database  
Should Be Re-competed," Report No. STD-13440**

NOS is not required by statute to produce electronic nautical charts, but supports and encourages such efforts through various mechanisms because of the critical importance of these new and developing products to safe navigation and because of various other mission goals. Moreover, the Safety of Life at Sea Convention, which sets international requirements dealing with safety of navigation for all ships, now includes provisions for the use of electronic charts in lieu of paper charts. At the same time, NOS recognizes that it has limited funds and expertise available for the development and production of these advanced nautical products.

With respect to raster nautical charts, the existing CRADA has worked well in the past and an abrupt termination of the CRADA would have disrupted the accessibility of these products to the public. In addition, there is a continuing need for research and development on raster products, especially with respect to making these products more widely available to the public through various mechanisms and with additional features. NOS and its CRADA partner now are planning for a smooth transition when the CRADA expires so that raster products will be continuously and widely available to the public. NOS has limited expertise in programming and software development and in the commercialization and distribution of raster products via the internet and other mechanisms. Further, there appears to be a shift in public demand away from raster products and toward vector products. Finally, the number of firms engaged in the business of producing raster charts is extremely limited.

In contrast to the situation for raster charts, no vector products have been produced under the CRADA. Consequently, disruption in the availability of these products is not a factor. Similarly, while research and development was needed to compress and manipulate raster files, to update such files, and to make them more easily accessible to the public, vector files are smaller and more manipulable. In general, the requirement for greater precision in the preparation of the Electronic Navigational Chart (ENC), which is intended as a scalable navigational aid for use with real-time Global Positioning System, has hindered the development of vector products rather than lack of research, software development or commercialization expertise. In addition, the vector chart industry is far more competitive than the raster industry. NOS amended the existing CRADA to remove vector charts as an agreed-upon product and intends to issue a Federal Register notice soon announcing the availability of vector data to the public. Such action is expected to allow NOS to encourage and utilize the capabilities of the private producers of vector charts in a manner that promotes competition. In addition, NOS intends to work with the industry to develop standards and a certification process for the private production and distribution of vector ENCs.

**OIG Recommendation 3:** We recommend that the Acting Under Secretary for Oceans and Atmosphere ensure delivery of the best value products and services to NOAA's customers by: Fully and openly competing NOAA's electronic nautical charting work as soon as possible if a CRADA is found to be the appropriate instrument.

**NOAA Response to Draft Audit OIG Report**  
**"Work on Electronic Charting Database Should Be Re-competed," Report No. STD-13440**

**NOAA Response:** NOAA does not concur with this recommendation. As noted above, NOS has determined that its mission is best served by continuing a CRADA with Maptech with respect to raster products. It should be noted that recompetition is not a quick or simple process and would result in a period of instability and uncertainty among software developers, chart agents, and end-users. Continuing the CRADA for raster products will allow for issuance of NOAA-Maptech Raster Nautical Charts without interruption while refinements in service delivery proceed to completion. The CRADA will continue for an additional 4½ years. At that time, no further renewals are anticipated.

In addition, the CRADA was amended to allow for open competition for vector chart products. Consequently, because no CRADA is anticipated for vector products, no competition or recompetition is contemplated.

**OIG Recommendation 4:** We recommend that the Acting Under Secretary for Oceans and Atmosphere ensure delivery of the best value products and services to NOAA's customers by: Strengthening NOAA's CRADA policy to include periodic reassessments to determine if the work needs to be competed and if a CRADA is still the most appropriate legal instrument for the work.

**NOAA Response:** NOAA concurs with this recommendation. NOS will ensure the CRADAs for which it is responsible are periodically reviewed. NOS expects to review the CRADA to (1) ensure the goals of the CRADA are being accomplished; (2) review whether a CRADA continues to be an appropriate mechanism for the project or activity; and (3) determine whether the CRADA should be re-competed. In addition to the 6-month interim progress reports, the mid-term point of a CRADA may be a good time to conduct such a comprehensive review. This would allow sufficient time to negotiate terms, should they be necessary, for renewing, re-competing, or terminating the CRADA.

**OIG Recommendation 5:** We recommend that the Acting Under Secretary for Oceans and Atmosphere ensure delivery of the best value products and services to NOAA's customers by: Ensuring that at least one procurement official is included on any future NOAA CRADA review panel.

**NOAA Response:** NOAA concurs with this recommendation. NOS will require at least one procurement official to serve on all panels reviewing the use of CRADAs for which it is responsible.

**NOAA Response to Draft Audit OIG Report "Work on Electronic Charting Database  
Should Be Re-competed," Report No. STD-13440**

**Finding II - NOAA Should strengthen Internal Controls over Collaborator Research Payments**

**OIG Recommendation 6:** We recommend that the Acting Under Secretary for Oceans and Atmosphere strengthen the internal controls over collaborator research payments from the current CRADA, if NOAA determines that it is the most appropriate legal instrument for continuing the work on its electronic nautical charting database, by regularly verifying, through review of accounting records, the accuracy and completeness of related net revenues that are reported to NOAA.

**NOAA Response:** NOAA concurs with this recommendation. NOS will establish an internal policy for quarterly reporting in connection with these obligations as well as the reporting of other financial transactions resulting from the CRADA. It should be noted that under the terms of the revised CRADA, NOS will not receive additional research payment fees. NOS has unexpended funds in the research payment fee account and much of the future research and development is expected to be conducted by Maptech and/or to benefit NOS and the public by making electronic chart products more widely available.

**Finding III - NOAA Should Retain and Enforce the CRADA's Reporting Requirement**

**OIG Recommendation 7:** We recommend that the Acting Under Secretary for Oceans and Atmosphere strengthen internal controls over project work, if NOAA determines that a CRADA is still the most appropriate legal instrument for continuing the work on its electronic nautical charting database, by retaining and enforcing the current CRADA provision that requires the partners to exchange formal written interim progress reports at least every six months and final reports within four months of project completion.

**NOAA Response:** NOAA concurs with this recommendation. As a matter of practice, NOS will comply with the current CRADA provisions requiring the exchange of formal written interim progress reports at least every six months and a final report within four months of project completion. The next NOS progress report is expected to be prepared by June 30, 2001.